

Guidelines For the Preparation of the

Operations and Maintenance Manual

For Municipal Utilities

Prepared by:

**DERM's Water and Wastewater
Conveyance Section**

**DEPARTMENT OF ENVIRONMENTAL RESOURCES
MANAGEMENT**

- DERM -

MIAMI-DADE COUNTY - FLORIDA

June 22, 1998



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Guidelines' Comments

1. The guidelines for the preparation of the OPERATIONS AND MAINTENANCE MANUAL were prepared to meet the report requirements set forth under Section 24-13.1(E) of the Miami-Dade County Code.
2. The reporting requirements for SPARE PARTS, pursuant to Section 24-13.1(F) of the Miami-Dade County Code are also contained within the guidelines. Such report is covered under items 5.23 and Appendix "I" through "K".
3. The descriptions shown for each topic contain only suggested item(s). Therefore, your final product shall not be limited to the contents of these descriptions.
4. You may add any additional topics within any of the main chapters, if you consider that they are necessary. For any proposed modifications to the guidelines, please contact Mr. Agustin Socarras, P.E., at 372-6793.

1. Introduction

1.1. Manual Description and Purpose

Indicate the general purpose, description, and audience of the manual.

1.2. Table of Contents

Show table of contents

1.3. Organization of the Manual

Explain the general organization of the manual and provide a brief description of its contents. Similarly, provide a brief description of each item included in the Appendices.

1.4. References and Updating of the Manual

Indicate if additional references, not included as an Appendix, are necessary. Indicate provisions for updating manual and make reference to accessibility to manual copies by the personnel.

1.5. Scope of Services

Make reference to the person(s), engineer(s) and/or consulting firm(s), which participated in the preparation of the manual.

1.6. Acknowledgments

If applicable.

2. Wastewater Collection/Transmission System

2.1. History

Provide history, location and background information of the sanitary sewer collection system. Include map showing the boundaries of the municipality and the utilities' service area.

2.2. Description of System

Describe sanitary sewer collection/transmission system components.

2.3. Components

Provide the inventory of the sanitary sewer collection/transmission system components. The inventory should include the following minimum information:

- *Pipe Diameter.*
- *Type of Pipe (Force Main or Gravity Pipe).*
- *Linear Footage.*
- *Pipe Material.*
- *Pipe Age.*
- *Number of Manholes.*

2.4. Reliability

Describe Means to assure continuous operation under any type of conditions. Address back up power supply, by-passing capabilities, hauling, etc.

3. Operation, Control and Monitoring Of The Wastewater Collection/Transmission System

3.1. Introduction

Indicate the main purpose of this chapter and describe references included in the Appendices.

3.2. Sewer System

Address type of facilities serviced, components, sewer atlas, sewer laterals, private system, etc.

3.3. Operational Considerations

Describe possible conditions that might be encountered during the operation of the sanitary sewer collection. Provide additional details of the construction of the gravity system, including, but not limited to, the lateral connections, manholes, clean-outs, etc. Analyze the design capabilities of the system, location, transmission capacity, pump stations, forcemains, etc.

Assure that the gravity collection system is operated as intended, pursuant to F.A.C. 62-604.500(2). Gravity sewer lines shall not be operated surcharged.

3.4. Remote Control/Alarm System

Describe the type of remote control equipment installed as well as the type of alarms used. Indicate reliability of the system. Describe procedures implemented relying on the remote control equipment.

Assure that all pump stations are equipped with properly functioning non-resettable elapsed time meters or power consumption meters for each pump as required by Section 24-13.1(B)(1) of the Miami-Dade County Code.

3.5. Emergency Operations

Indicate factors that may create or be involved in emergencies. Describe procedures to be implemented to assure uninterrupted service during an emergency, such as temporary lines and manhole by-passing, portable pump, etc.

3.6. Operational Problems

Describe operational problems associated with the sanitary sewer collection and transmission system such as sewage blockages, cracks, root intrusions, leaks, infiltration and inflow, gas build up, etc. Describe impact to the sewer system. Provide description of alternative ways of solving these types of problems, including the type of equipment recommended.

3.7. Troubleshooting Guide

Provide troubleshooting techniques to be used according to the type of problem.

3.8. Pretreatment Facilities on System

If there are any pretreatment facilities within the system, provide list with specific information about each facility. Address actions to be taken in case of emergencies associated with these types of facilities. Make information available to sanitary sewers maintenance personnel.

4. Personnel

4.1. Introduction

Indicate the purpose and need for a properly, reliable and competent sanitary sewer collection staff.

4.2. Organization

Describe the organization. Address personnel responsibilities.

4.3. Staffing Requirements

Provide list of personnel recommended for meeting the minimum levels of service required in relation to the service area characteristics.

4.4. Operating Personnel Responsibilities

Describe main responsibilities expected from operating personnel.

4.5. Management and its Responsibilities

Describe main responsibilities expected from management personnel.

4.6. Personnel Qualifications

Provide qualifications summary for each position. Include certification, education level, skills and other qualifications needed to perform duties required by the positions. Use Appendix, if necessary.

4.7. Personnel Certifications

Describe types of certifications required and/or used by the utility.

4.8. Staffing Plan

Describe personnel available during normal operation. Address staffing during personnel absences.

4.9. Training Courses

Provide description of different training courses required and/or available to the sanitary sewer collection system personnel.

4.10. Personnel Records

Describe process to keep and maintain the personnel record. Including time keeping, training summaries, annual reviews, etc.

5. Emergency Operating and Response Program

5.1. Introduction

Introduce main issues and/or plans associated with emergency responses.

5.2. Purpose and Objectives

List purpose and/or objectives of this chapter.

5.3. Causes of Emergencies

List and describe main causes of emergencies. Include natural, Public (civil disorder), maintenance, accidents, etc.

5.4. Vulnerability Analyses / Failure Review

Provide alternatives to possible emergency situations encountered in the operation of the sanitary sewer collection system. Including, but not limited to, power failures, pumping stations, false alarms, emergency power, etc.

5.5. Methods to Reduce Vulnerability

List methods incorporated in the design or operation geared toward reducing vulnerability during emergencies.

5.6. Breaks and Stoppages

Describe procedures to be followed in order to correct sewer lines blockages or breaks. Provide written Contingency Plan for Sanitary Sewer Overflows (See [Attachment A](#)).

5.7. By-pass Procedures

Describe procedures to be followed in the event that by-pass of the sanitary sewer must be implemented.

5.8. Equipment Breakdowns

Describe procedures to be followed in the event that sanitary sewer equipment suffers a breakdown. Discuss likelihood of this happening.

5.9. Civil Disorders

Describe procedures to be followed in the event that civil disorders and/or vandalism of the sanitary sewer occur.

5.10. Spills of Fuels, Toxic or Hazardous Materials into Sewer

Describe procedures to be followed in the event that spills of fuels, toxic or hazardous materials get into the sanitary sewer.

5.11. Hurricane Emergency

Address hurricane preparedness. Include copy of the plan in the Appendix.

5.12. Fire Emergency

Address fire and/or explosives emergency response. Attach corresponding manuals.

5.13. Personnel Injury

Describe procedures to be followed in the event that minor or major injuries occur.

5.14. Mutual Aid Agreements

Address any agreement made with any other utility and/or agencies to respond or assist in the event of emergencies.

5.15. Emergency Equipment Inventory

Provide a list of emergency equipment available. Indicate type, quantity, location, etc (see [Attachment D](#)).

5.16. Emergency Pumps

Provide a list of emergency pumps available. Indicate size, quantity, location, etc.

5.17. Emergency Generators

Provide a list of emergency generators available. Indicate size, quantity, location, fuel capacity, voltage, etc.

5.18. Disinfecting Policy

Describe methods for disinfection of public access areas contaminated with sanitary sewer. Indicate type, quantity and location of the disinfecting material available to the emergency response team. Indicate agencies to be notified in the event of surface or ground water contamination. Note exceptions of the disinfecting policy for sanitary sewer contamination of sensitive bodies of water (see [Attachment E](#)).

5.19. Coordinating Instructions with Police and Fire Department

Provide instructions to be followed regarding communication with the police and fire department personnel in the event that a sanitary sewer emergency occurs.

5.20. Personnel Responsibilities

Describe main personnel responsibilities during an emergency, according to each specific position.

5.21. Emergency Operations Center

Indicate location, schedule, personnel and details of operations during emergencies.

5.22. Emergency Telephone Numbers List and Contact Plan

Provide detailed table with all agencies phone numbers, which shall be notified after an emergency (see Appendix A).

5.23. Critical and Non-Critical Spare Parts to be Secured From Vendors or Other Utilities if Needed

Provide list with information regarding all critical and non-critical spare parts to be secured from vendors (see [Attachment C](#)).

6. Safety

6.1. Introduction

Introduce main topics to be addressed in this chapter. Provide publication and any additional comments as required.

6.2. Prevention

Provide main elements or guidelines geared toward preventing accidents. Address other related activities associated with this matter.

6.3. Management's Safety Responsibilities

Provide analysis of management responsibilities regarding accidents. Indicate steps to be followed by management when an accident occurs.

6.4. Treatment of Injures

Address provisions to be taken in the event that an injury occurs. Provide list of equipment available to treat injuries or procedures to be followed.

6.5. Sewer Maintenance Hazards

Provide detailed information about hazards. Address precautions, procedures and equipment required to provide a safe working environment.

6.6. Manhole Atmospheric Testing

Address OSHA Regulation regarding gas testing when entering confined spaces. List all tests that must be performed before entering a confined space, including, but not limited to oxygen deficiency. Describe properties of common gases found in sewer collection systems.

6.7. Electrical System Hazards Lock Out / Tag Out

Outline potential hazards involved with pressurized pipes and/or the presence of electricity and water. Provide precaution and procedures to be followed to prevent this type of hazards, including, but not limited to lock-out/tag-out procedures.

6.8. Mechanical Equipment Hazards

Provide detailed rules or guidelines to be implemented when working or operating mechanical equipment. Describe procedure for valve exercising and tagging during maintenance and/or repair activities.

6.9. Explosion and Fire Hazards

Address possible causes of fire or explosions when working in the sewer collection systems. Provide specific instructions to be followed in the event that either such event occurs. List equipment required to handle these type of emergencies.

6.10. Bacteriological Infections and Health Hazards

Provide mechanisms to prevent diseases when personnel are exposed to wastewater. List protective measures and precautions to be followed, including vaccinations.

6.11. OSHA Confined Spaces Permit Required

Address OSHA requirements for Confined space entry. Provide copy of the permit required.

6.12. Safety Equipment

Provide list of equipment and tools for use in sewer maintenance work. Include safety equipment.

6.13. General Safety Practices

Provide summary of general practices and precautions to be taken by all personnel.

6.14. Vehicle Safety Practices

Provide general practices and precautions to be taken when driving a vehicle used in the sewer maintenance program.

6.15. Safety Publications available at the O&M Library

List publications available.

6.16. Safety References

List publications available, including the Material Safety Data Sheet (MSDS).

7. Records

7.1. Introduction

List type of records or reports that are kept in the Operation and Maintenance program.

7.2. Safety Records

Provide description of all records or reports that are kept in the safety program such as accidents, minor injuries, etc.

7.3. Personnel Records

Provide description of all personnel records kept such as immunization, training, etc.

7.4. Operational and Maintenance Records

Provide description of all records or reports that are kept in the Operation & Maintenance program. Overflows, odor complaints, pump stations elapsed time reports.

8. Maintenance

8.1. Introduction

Introduce main topics to be addressed in this chapter. List objectives of a preventive maintenance program.

8.2. Equipment Record System

Outline procedures to keep track of the equipment used in the Operation & Maintenance program. Describe numbering system, equipment record system and equipment being used tracking system, if any.

8.3. Planning and Scheduling

Address planning and scheduling requirements for the effective implementation of the preventive Maintenance program. Analyze system performance and project future maintenance activities accordingly. Provide list of seasonal as well as annual maintenance activities (see [Attachment B](#)).

8.4. Sanitary Sewer Collection/Transmission System Maintenance Schedule

Provide detailed procedure and scheduling for the inspection and repairs of sanitary sewer lines (see [Attachment B](#)).

8.5. Pump Station Maintenance Schedule

*Provide detail procedure and scheduling for the inspection and repairs of sanitary sewer pump stations. Address daily, weekly, monthly and annual maintenance activities. Include Dry/Wet Well station inspections (see [Attachment B](#)).
Assure that pump station maintenance schedules meets the minimum inspection frequency as required by Section 24-13.1(C)(1) (see [Attachment B](#)).*

8.6. Equipment Maintenance Schedule

Provide maintenance schedule for the equipment used in sanitary sewer collection system.

8.7. Stockroom and Inventory System

Indicate provision taken for storage of spare parts and special tools or equipment. Outline procedure for purchasing spare parts, tools and other equipment used in the maintenance program.

8.8. Costs and Budget for the Maintenance Operation

Outline procedure for estimating future projects. Indicate resources or data required in the preparation of the maintenance budget.

8.9. Housekeeping

Describe housekeeping activities to be implemented in order to assure an effective Operation & Maintenance program.

8.10. Special Tools

Describe procedure to be implemented when using special tools.

8.11. Warranties

Address procedures regarding equipment or general contractors warranties.

8.12. Contract Maintenance

Outline criteria and/or decision making process for the assignment of some maintenance activities to outside/private firms.

9. Public Utilities

9.1. Introduction

Address importance of contacting public utilities.

9.2. Electrical

Provide emergency contact name and phone number.

9.3. Telephone

Provide emergency contact name and phone number.

9.4. Water

Provide emergency contact name and phone number.

9.5. UNCLE / SUNSHINE

Provide contact name and phone number.

10. Laboratory Testing

10.1. Introduction

Address importance of laboratory testing of the sanitary sewer collection system.

10.2. Contracts for Testing Lab

Provide current or alternate laboratory testing facilities, if applicable.

10.3. Conditions Requiring Tests

Indicate specific cases that require testing.

10.4. Testing Standards

Provide standards for testing of the wastewater, ground or surface waters.

Appendices

A. Sewer Complaint Calls

Indicate importance of an effective public communication system. Provide standard guidelines for answering general and/or most typical complaint calls to the utility.

B. Emergency Generator Operation

Provide standard operating procedures regarding the use of emergency generators.

C. Welding and Cutting (Hot Work)

Provide standard operating procedures regarding welding and cutting (hot work) activities. Provide sample of Hot Work permit.

D. DERM Run Time Reporting Procedure

Provide standard procedures regarding the collection of the run time (elapsed time) for the sanitary pump stations.

E. Sewer Clogs in Mains or Laterals Clearing Procedure

Provide standard procedures regarding cleaning or correcting sanitary sewer clogs conditions.

F. Site Excavation

Provide standard procedures for activities that require excavations. Include safety requirements.

G. Traffic Control

Provide standard procedures regarding traffic control during regular working hours and/or emergency conditions. List required equipment.

H. Wastewater Service Area Atlas

Provide sanitary sewer atlas for the entire collection system. Clearly show all publicly or privately owned sanitary pump stations and their corresponding sewer service areas, main sizes, manholes, etc.

I. Emergency Equipment Inventory List

Provide list of all emergency equipment to respond to emergency situations. Indicate quantities available and specific description (see [Attachment D](#)).

J. Emergency Spare Parts List

Provide list of all emergency spare parts and equipment to respond to emergency situations. Indicate quantities available and specific description (see [Attachment C](#) and [Attachment D](#)).

K. Vendor List

Provide list of vendors for emergency supplies. Indicate specific items, or group of items, for each vendor.

L. Pump Station Tabulation

Provide tabulation of each pump sanitary sewer pump station. Indicate Pump's manufacturer and model, pump capacity and total dynamic head, impeller diameter, horsepower and rated r.p.m.

M. Pipeline Tabulation

Provide tabulation of each pipe diameter encountered in the sanitary sewer system. Indicate type and total pipe length. Organize table by pump station basin.